

1. A bus arbitration method for a processor based system, the system comprising a hub device coupled to a processor by a processor bus and coupled to a memory device by a memory bus, said hub device being connected to a first device by a link bus, said method comprising the steps of:

5 issuing, from one of the first device and the hub device, an arbitration request on the link bus;

determining, at the first device and the hub device, whether control of the link bus can be transferred to the device issuing the arbitration request; and

if it is determined that control of the link bus can be transferred, granting
10 control of the link bus to the device issuing the arbitration request, wherein control of the link bus is granted by the first device and the hub device.

2. The method of claim 1, wherein said determining step comprises:
inspecting internal arbitration state and status information; and
determining if control of the link bus can be transferred based on the
15 inspected internal arbitration state and status information.

3. The method of claim 2, wherein the internal arbitration state information comprises a current arbitration state selected from the group consisting of a park state indicating that there are no requests on the link bus, grant-self state indicating that a device in control of the link bus is transferring
20 information on the link bus, and a grant-other state indicating that another device is in control of the link bus.

4. The method of claim 2, wherein the internal status information comprises a current status value selected from the group consisting of a bus master arbitration request, bus master transfer in progress, bus slave arbitration request, and bus slave transfer in progress.

5. The method of claim 1, wherein said granting step comprises:
modifying internal arbitration state and status information to reflect that the issuing device is a master of the link bus and that the other device connected to the link bus is a slave of the link bus.

6. The method of claim 5, wherein the internal arbitration state information comprises a current arbitration state selected from the group consisting of a park state indicating that there are no requests on the link bus, grant-self state indicating that a device in control of the link bus is transferring information on the link bus, and a grant-other state indicating that another device is in control of the link bus.

7. The method of claim 6, wherein said modifying step comprises:
at the first device, changing the internal arbitration state to the grant-self state; and
at the hub device, changing the internal arbitration state to the grant-other state.

8. The method of claim 6, wherein said modifying step comprises:

at the hub device, changing the internal arbitration state to the grant-self state; and

at the first device, changing the internal arbitration state to the grant-other state.

5 9. The method of claim 6, wherein said modifying step comprises:

at the first device, changing the internal arbitration state from the park state to the grant-self state; and

at the hub device, changing the internal arbitration state from the park state to the grant-other state.

10 10. The method of 6, wherein the internal status information comprises a current status value selected from the group consisting of a bus master arbitration request, bus master transfer in progress, bus slave arbitration request, and bus slave transfer in progress.

11. The method of claim 10, wherein the internal arbitration state is
15 changed from the park state to the grant-other state if the internal status reflects the bus master arbitration request and not the bus slave arbitration request.

12. The method of claim 10, wherein the internal arbitration state is changed from the park state to the grant-self state if the internal status reflects the bus slave arbitration request.

13. The method of claim 10, wherein the internal arbitration state is changed from the grant-self state to the grant-other state if the internal status reflects the bus slave arbitration request and not the bus slave transfer in progress state.

5 14. The method of claim 10, wherein the internal arbitration state is changed from the grant-other state to the grant-self state if the internal status reflects the bus slave arbitration request and not the bus master transfer in progress state.

10 15. The method of claim 10, wherein the internal arbitration state is changed from the grant-other state to the park state if the internal status does not reflect the bus master arbitration request, the bus slave arbitration request and the bus master transfer in progress state.

15 16. The method of claim 1, wherein the link bus comprises a link bus status line and said issuing step comprises propagating a signal on the link bus status line.

17. The method of claim 1, wherein the link bus comprises a link bus status line and said issuing step comprises time multiplexing an arbitration request signal on the link bus status line.

20 18. The method of claim 1, wherein said issuing step through said granting step are performed in accordance with a link bus protocol of the link bus.

19. A method of arbitrating control of a link bus in a computer system, the computer system comprising a hub device coupled to a processor by a processor bus and coupled to a memory device by a memory bus, the hub device being connected to a satellite device by the link bus, the link bus being a source
5 strobed bus having a status line, said method comprising the steps of:

time-multiplexing, from one of the satellite device and the hub device, an arbitration request signal on the link bus status line;

detecting, at the other of the satellite device and the hub device, the arbitration request signal;

10 determining, at the satellite device and the hub device, whether control of the link bus can be transferred to the device issuing the arbitration request; and

if it is determined that control of the link bus can be transferred, granting control of the link bus to the device issuing the arbitration request, wherein control of the link bus is granted by the satellite device and the hub device.

15 20. The method of claim 19, wherein said determining step comprises:

inspecting internal arbitration state and status information contained on each of the satellite device and the hub device; and

determining if control of the link bus can be transferred based on the inspected internal arbitration state and status information.

20 21. The method of claim 20, wherein the internal arbitration state information comprises a current arbitration state selected from the group

consisting of a park state indicating that there are no requests on the link bus, grant-self state indicating that a device in control of the link bus is transferring information on the link bus, and a grant-other state indicating that another device is in control of the link bus.

5 22. The method of claim 20, wherein the internal status information comprises a current status value selected from the group consisting of a bus master arbitration request, bus master transfer in progress, bus slave arbitration request, and bus slave transfer in progress.

10 23. The method of claim 19, wherein said granting step comprises:
modifying internal arbitration state and status information on each of the satellite device and the hub device to reflect that the issuing device is a master of the link bus and that the other device connected to the link bus is a slave of the link bus.

15 24. The method of claim 23, wherein the internal arbitration state information comprises a current arbitration state selected from the group consisting of a park state, grant-self state and a grant-other state.

 25. The method of claim 24, wherein said modifying step comprises:
at the satellite device, changing the internal arbitration state to the grant-self state; and

at the hub device, changing the internal arbitration state to the grant-other state.

26. The method of claim 24, wherein said modifying step comprises:

at the hub device, changing the internal arbitration state to the grant-self

5 state; and

at the satellite device, changing the internal arbitration state to the grant-other state.

27. The method of claim 24, wherein said modifying step comprises:

at the satellite device, changing the internal arbitration state from the park

10 state to the grant-self state; and

at the hub device, changing the internal arbitration state from the park state to the grant-other state.

28. The method of 24, wherein the internal status information

comprises a current status value selected from the group consisting of a bus master

15 arbitration request, bus master transfer in progress, bus slave arbitration request, and bus slave transfer in progress.

29. The method of claim 28, wherein the internal arbitration state is

changed from the park state to the grant-other state if the internal status reflects the bus master arbitration request and not the bus slave arbitration request.

30. The method of claim 28, wherein the internal arbitration state is changed from the park state to the grant-self state if the internal status reflects the bus slave arbitration request.

31. The method of claim 28, wherein the internal arbitration state is changed from the grant-self state to the grant-other state if the internal status reflects the bus slave arbitration request and not the bus slave transfer in progress state.

32. The method of claim 28, wherein the internal arbitration state is changed from the grant-other state to the grant-self state if the internal status reflects the bus slave arbitration request and not the bus master transfer in progress state.

33. The method of claim 28, wherein the internal arbitration state is changed from the grant-other state to the park state if the internal status does not reflect the bus master arbitration request, the bus slave arbitration request and the bus master transfer in progress state.

34. A processor system comprising:

a processor;

a link hub connected to said processor via a processor bus;

a satellite device; and

a link bus connected between said link hub and said satellite device,
wherein said satellite device and said link hub arbitrate a control of said link bus by
issuing, from one of said satellite device and said link hub, an arbitration request
on the link bus, determining, at the satellite device and said link hub, whether
5 control of said link bus can be transferred to the device issuing the arbitration
request, and granting control of said link bus to the device issuing the arbitration
request.

35. The system of claim 34, wherein said satellite device and said link
hub determine if control of said link bus should be transferred by inspecting
10 respective internal arbitration state and status information, and determining if
control of said link bus can be transferred based on said inspected internal
arbitration state and status information.

36. The system of claim 35, wherein said internal arbitration state
information comprises a current arbitration state selected from the group
15 consisting of a park state indicating that there are no requests on the link bus,
grant-self state indicating that a device in control of the link bus is transferring
information on the link bus, and a grant-other state indicating that another device
is in control of the link bus.

37. The system of claim 35, wherein the internal status information
20 comprises a current status value selected from the group consisting of a bus master

arbitration request, bus master transfer in progress, bus slave arbitration request, and bus slave transfer in progress.

38. The system of claim 34, wherein said link bus is a source strobed bus.

5 39. The system of claim 38, wherein said link bus comprises a link bus status line and said arbitration request is issued by propagating a signal on said link bus status line.

40. The system of claim 38, wherein said link bus comprises a link bus status line and said arbitration request is issued by time multiplexing an arbitration
10 request signal on said link bus status line.

41. The system of claim 34, wherein said wherein said satellite device and said link hub grant control of said link bus by modifying respective internal arbitration state and status information to reflect that the issuing device is a master of the link bus and that the other device connected to the link bus is a slave of the
15 link bus.

42. The system of claim 41, wherein said internal arbitration state information comprises a current arbitration state selected from the group consisting of a park state indicating that there are no requests on the link bus, grant-self state indicating that a device in control of the link bus is transferring

information on the link bus, and a grant-other state indicating that another device is in control of the link bus.

43. The system of claim 42, wherein said satellite device modifies its internal arbitration state and status information by changing its internal arbitration state to the grant-self state, and wherein said link hub modifies its internal arbitration state and status information by changing its internal arbitration state to the grant-other state.

44. The system of claim 42, wherein said satellite device modifies its internal arbitration state and status information by changing its internal arbitration state to the grant-other state, and wherein said link hub modifies its internal arbitration state and status information by changing its internal arbitration state to the grant-self state.

45. The system of 42, wherein said internal status information comprises a current status value selected from the group consisting of a bus master arbitration request, bus master transfer in progress, bus slave arbitration request, and bus slave transfer in progress.

46. The system of claim 42, wherein said internal arbitration state is changed from the park state to the grant-other state if said internal status reflects the bus master arbitration request and not the bus slave arbitration request.

47. The system of claim 42, wherein said internal arbitration state is changed from the park state to the grant-self state if said internal status reflects the bus slave arbitration request.

48. The system of claim 42, wherein said internal arbitration state is changed from the grant-self state to the grant-other state if said internal status reflects the bus slave arbitration request and not the bus slave transfer in progress state.

49. The system of claim 42, wherein said internal arbitration state is changed from the grant-other state to the grant-self state if said internal status reflects the bus slave arbitration request and not the bus master transfer in progress state.

50. The system of claim 42, wherein said internal arbitration state is changed from the grant-other state to the park state if said internal status does not reflect the bus master arbitration request, the bus slave arbitration request and the bus master transfer in progress state.

51. A processor based system comprising:

a processor;

a link hub connected to said processor by a first bus;

a satellite device; and

a link bus connected between said link hub and said satellite device, said link bus comprises a link bus status line and having a link bus protocol, wherein said satellite device multiplexes an arbitration signal on said link bus status line in accordance with said link bus protocol to become a master of said link bus during transmissions to said link hub and said link hub multiplexes another arbitration signal on said link bus status line in accordance with said link bus protocol to become a master of said link bus during transmissions to said satellite device.

52. The system of claim 51, wherein said link bus is a source strobed bus.

53. The system of claim 51, wherein said link bus is a quad pumped source strobed bus.

54. The system of claim 51, wherein said link bus is a double pumped source strobed bus.

55. The system of claim 51, wherein said arbitration signals are time multiplexed on said link bus status line during a predetermined time window.

56. The system of claim 52, wherein said link bus status line is used to transmit status information between said link hub and said satellite device.

57. A processor based system comprising:

a processor;

a first device connected to said processor by a first bus;

a second device; and

a link bus connected between said first and second devices, said link bus comprises a source strobed command/address/data bus, two clock strobes and a link bus status line, said link bus having a link bus protocol, wherein said first and second devices arbitrate control over said link bus in a decentralized manner and in accordance with said link bus protocol.

58. The system of claim 57, wherein said link bus status line is a tristate status line.

59. The system of claim 57, wherein said first device is a link hub and said second device is a satellite device.

60. The system of claim 57, wherein said first and second devices are satellite devices.